Dec. 4, 1923. 1,476,534

A. H. MEYER

VALVE

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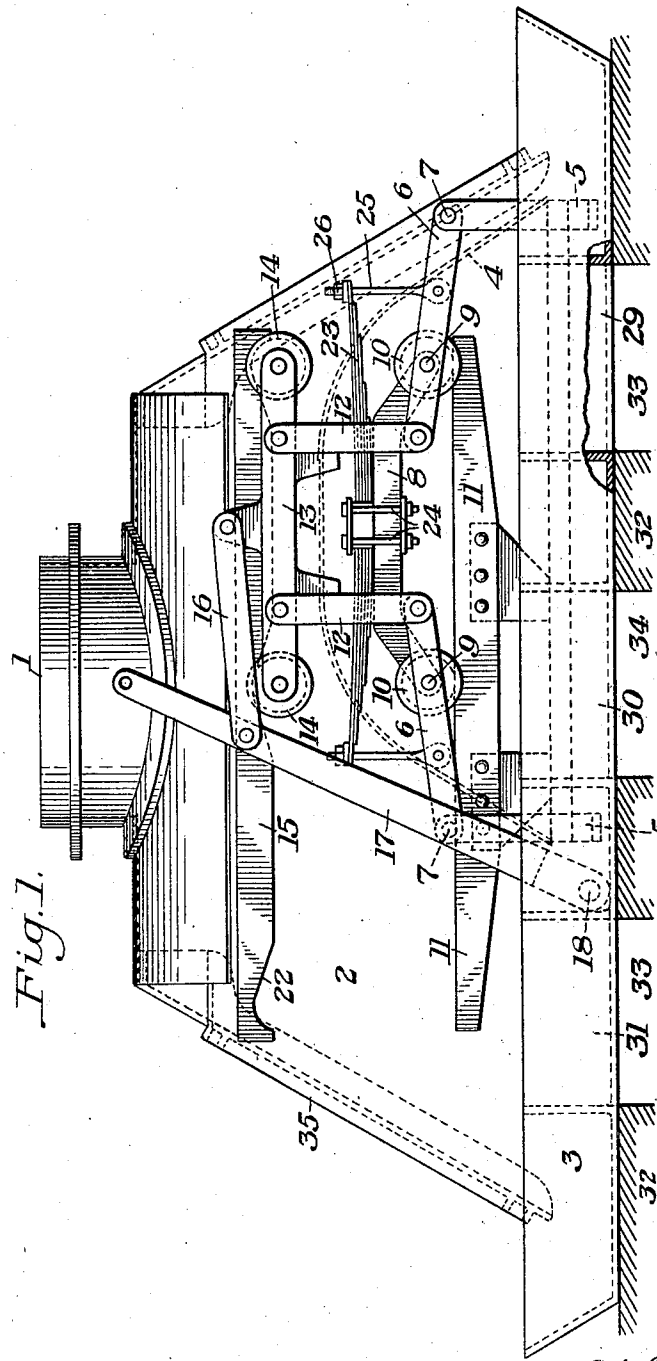


Fig. 1.

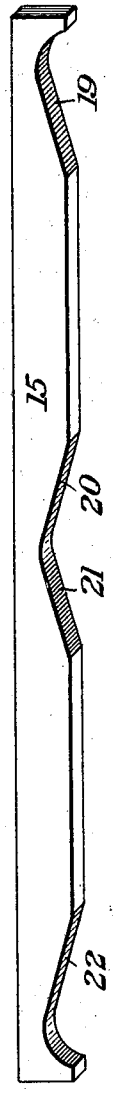


Fig. 2.

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Fig. 4.

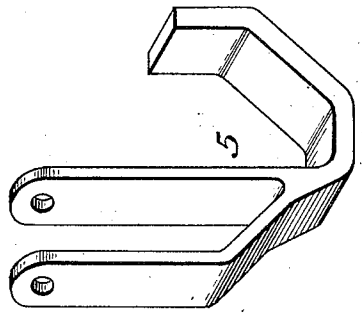
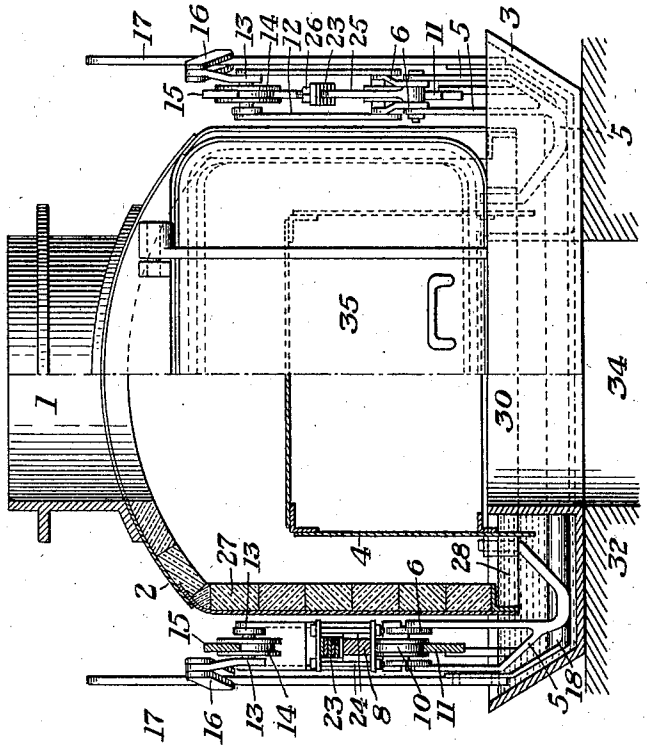


Fig. 3.



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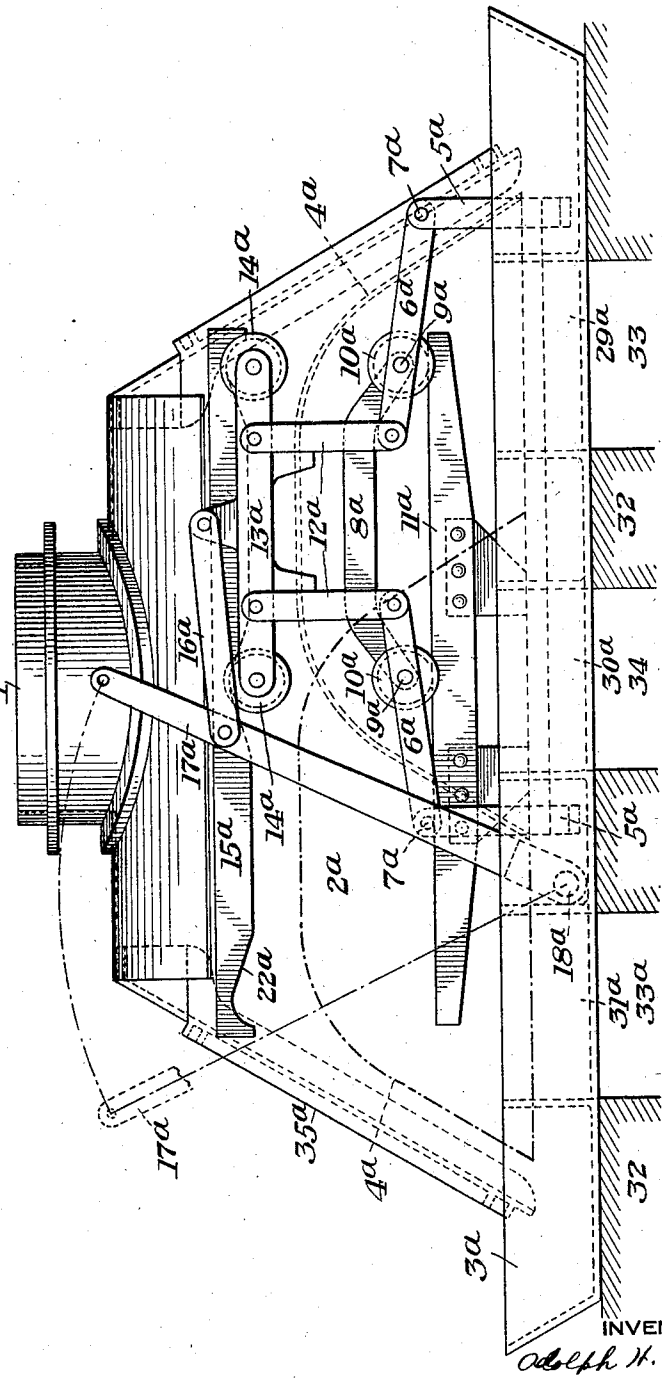
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VALVE

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Fig. 5.



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Patented Dec. 4, 1923. 1,476,534

UNITED STATES PATENT OFFICE.

ADOLPH H. MEYER, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO H. L. DIXON COMPANY, OF CARNEGIE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

VALVE.

Application filed November 7, 1921. Serial No. 513,290.

To all whom it may concern:

Be it known that I, ADOLPH H. MEYER, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny, State of Pennsylvania, have invented a new and useful Improvement in Valves, of which the following is a full, clear, and exact description.

My invention relates to valves, and particularly to reversing valves. My invention comprehends a valve wherein the valve member is lifted and carried from one position to another and is counter-balanced by simple means which do not add materially to the weight of the structure, but by reason of which the device is rendered easily operable.

My preferred structure includes two sets of substantially parallel guides or tracks between which is mounted a carriage provided with connections whereby the hood is substantially counter-balanced by a spring and wherein cam surfaces are provided on one of each set of said guides or trackways for actuating link connections to lift the hood to the top of the flues during the first period of its movement. A straight portion holds the hood in its lifted position during the second or intermediate part of its movement and cam surfaces allow the hood to be lowered during the third period of its movement. The other guide or track carries the structure by which the hood is moved from one position to another.

My invention will be better understood by reference to the following description in connection with the accompanying drawings showing one embodiment of my invention, and in which:

Figure 1 is a side elevation of a valve embodying my invention,

Figure 2 is a perspective view of one of the guides or tracks,

Figure 3 is a view showing an end view of the valve, one half of which is shown in section,

Figure 4 is a detail of one of the members for operating the hood, and

Figure 5 is a side elevation of a modification showing the hood in dotted outline in two positions.

I have chosen to illustrate and describe herein my invention as applied to a gas reversing valve for use in connection with a gas-fired furnace.

Referring to the drawings, the reversing valve comprises a nozzle 1, a casing 2, a base 3, a hood 4, and mechanism for moving the hood from one position to another for reversing the flow through the furnace. The valve rests on the mason work 32 of a furnace or other structure through which the fluid controlled by the valve passes and by which the flow is reversed. The casing 2 is provided at each end with doors 35 through which access is given to the interior construction for inspection or repairs.

The mechanism for reversing the valve is divided, and duplicate parts are placed on each side of the casing. As these parts are identical, only one part will now be described. Members 5 shown in detail in Figure 4, are attached to the four corners of the hood 4. The members 5 are bifurcated at one end and are pivotally connected to first class levers 6 by bolts 7. The levers 6 are pivotally connected, intermediate their ends, to the carrier bars 8 at 9. The bars 8 are provided with rollers 10 which run on guides or tracks 11, supported by the base 3. The other ends of the levers 6 are pivotally connected to links 12, which in turn are connected to members 13 provided with rollers 14, mounted on guides or tracks 15. A link 16 is pivotally connected to the members 13 and to an operating lever 17 having a pivotal mounting 18.

The guide or track 15 is provided with cam surfaces 19, 20, 21 and 22 as best shown in Figure 2. The function of these cam surfaces will be explained later.

A spring 23 is connected at its central portion to the carrier bars 8 by means of the shackles 24. The ends of the spring 23 are connected to the links 6 by hanger bolts 25, provided with nuts 26 for the purpose of adjusting the counter balancing effect of the spring 23. It will be noted that the ends of the spring 23 are connected to the levers 6 between the pivotal points 7 and 9, and the spring, therefore, normally acts to lift the hood 4, thus counter-balancing the weight of the same. By adjusting the nuts 26 the hood 4 may be counter-balanced in such a manner that very little effort is required to lift the same.

The interior of the casing 2 is lined with any suitable refractory material 27, and the casing extends downwardly into the base 3, so that its lower edge forms a water seal with the water 28 in the base 3. The hood 4 likewise extends downwardly into the water 28 and the lower edges of the sides thereof project into the water to form a seal at all times. The lower edges of the ends of the hood 4 remain in the water at all times, except during the movement of the hood 4 from one position to another, and during this period they are not lifted a substantial distance above the surface of the water.

The base 3 is provided with three flues 29, 30 and 31. The flues 29 and 31 are connected to the furnace through the flues 33 and the flue 30 is connected to a chimney through the flue 34. The nozzle 1 is connected with the fuel supply, or with any other gaseous fluid to be controlled by the valve.

A modification of my invention is shown in Figure 5. The parts of the device shown in Figure 5 are designated by the same numerals as corresponding parts in the other figures, except the numerals as applied to Figure 5 have affixed thereto the exponent "*a*".

The modification shown in Figure 5 is the same in all respects as that shown in the other figures, except that the spring 23 and the means for operatively connecting the spring are omitted from the device as shown in Figure 5. It will, therefore, be unnecessary to describe the mechanism of Figure 5 in detail. The hood 4^a is shown in double dotted lines connecting the flue 29^a with the chimney 30^a and in chain lines connecting the flue 31^a with the chimney. In the first position, the gaseous fluid enters through the nozzle 1, passes downwardly through flue 31^a through a furnace or other device, and the products of combustion return through flue 29^a, pass under the member 4^a and out to a chimney through flue 30^a. In the second position of the hood, the gaseous fluid enters through the nozzle 1^a, passes downward through the flue 29^a to a furnace or other device, and the products of combustion return through the flue 33^a and enter the valve through flue 31^a, go under the hood to flue 30^a and to a chimney through flue 34.

The operation of my valve is as follows: If it is desired to move the hood from the position shown in Figure 1 to a position connecting the flues 30 and 31 together, the operating lever 17 is moved to the left. The movement of the lever 17 moves the member 13 to the left and during the first period of the movement causes the rollers 14 to move on the cam surfaces 19 and 21. This causes a downward movement of the members 13, and also a downward movement of the inner ends of each of the levers 6 around the pivotal points 9, and produces an upward movement of the outer ends of the levers 6 which in turn lift the hood through the members 5. The upward movement of the hood is such as to clear the tops of the flues 29, 30 and 31, and during the second period of movement as the rollers 14 move over the horizontal surfaces of the members 15, the hood is carried to the left in a truly horizontal direction to connect the flues 30 and 31 together and to uncover the flue 29. During the third period of movement of the hood the rollers 14 move along the cam surfaces 20 and 22, permitting an upward movement of the members 13 and a corresponding downward movement of hood so that it operatively interconnects the flues 30 and 31 and forms a water seal, and also uncovers the flue 29.

In order to reduce the effort necessary to move the hood from one position to another the nuts 26 are so adjusted on the hanger bolts 25 that the weight of the hood is substantially counter-balanced. It will be apparent, therefore, that in moving the hood from one position to another it is only necessary to overcome the unbalanced weight of the hood and that this is very easily accomplished by reason of the fact that the rollers 14 operate upon the gradually inclined cam surfaces 19, 20, 21 and 22.

In the modification shown in Fig. 5 the operation is identical to that above described, except that in this form there is no spring to counter-balance the weight of the hood. The operation of this device, therefore, requires somewhat more effort, but due to the gradual incline of the cam surfaces on the guides or tracks 15^a, the entire weight of the hood is overcome with little difficulty.

My invention has many advantages, among which may be noted that the hood is counterweighted by means which do not add materially to the weight of the structure; the movement of the hood from one position to another is accomplished with little effort; the operating mechanism is outside of the casing and is, therefore, not subjected to the temperature within the casing; the hood is moved away from the flues only during the first period of its movement and during the intermediate part or second period of its movement it is moved parallel to a plane touching the tops of the flues and during the third period of its movement it is moved toward the flues to operatively connect two of the same; this arrangement allows a movement of the hood from one position to another with minimum movement away from the tops of the flues thus reducing the lifting effort and the clearance between the hood and the ends of the flues to a minimum. By reason of the foregoing features the operating mechanism is of minimum weight and due to the relatively small weight, the device is easily operated.

Many changes may be made in the details of construction without departing from the spirit of my invention.

I claim:

1. In a valve, a movable counterbalanced hood, a fixed track therefor, means for moving said hood along said track, and means in fixed spaced relation to said track and cooperating therwith for imparting a substantially vertical movement to said hood at the commencement and conclusion of its travel only, substantially as described.

2. In a valve, a movable hood, means for moving said hood vertically throughout separated portions of its movement and in a truly horizontal direction throughout the remainder of its movement, and a spring exerting a continuous upward lift on said hood for counterbalancing the weight thereof, suubstantially as described.

3. In a valve, a hood, a pair of tracks extending in substantially parallel relationship on each side of said hood, means co-operating with said tracks and traveling therebetween for shifting the hood laterally, and means effective only at the initial and concluding movements of the hood for imparting a vertical movement thereto, substantially as described.

4. In a valve, a hood, a pair of tracks extending in substantially parallel relationship on each side of said hood, means cooperating with said tracks and traveling therebetween for shifting the hood laterally, means carried by said first mentioned means for substantially counterbalancing the weight of the hood, and means effective only at the initial and concluding movements of said hood for imparting a vertical movement thereto, substantially as described.

5. In a valve, a hood, a pair of tracks extending in substantially parallel relationship on each side of said hood, means cooperating with said tracks and traveling therebetween for shifting the hood laterally, a spring carried by said first mentioned means for substantially counterbalancing the weight of the hood, and means effective only at the initial and concluding movements of the hood for imparting a raising or lowering movement thereto, substantially as described.

6. In a valve, a hood, a pair of tracks extending in substantially parallel relationship on each side of said hood, means cooperating with said tracks and traveling therebetween for shifting the hood laterally, said means including levers movable about axes fixedly carried by said means, and means effective at the initial movement of the hood only for moving one end of each of said levers to thereby lift the hood, said levers being automatically movable in the opposite direction at the concluding movement of said first mentioned means for thereby lowering the hood, substantially as described.

7. In a valve, a hood, a pair of tracks extending in substantially parallel relationship on each side of said hood, means cooperating with said tracks and traveling therebetween for shifting the hood laterally, said means including levers movable about axes fixedly carried by said means, means effective at the initial movement of the hood only for moving one end of each of said levers to thereby lift the hood, said levers being automatically movable in the opposite direction at the concluding movement of said first mentioned means for thereby lowering the hood, and means cooperating with said levers for normally counterbalancing the weight of the hood, substantially as described.

8. In a valve, a hood, a pair of tracks extending in substantially parallel relationship on each side of said hood, means cooperating with said tracks and traveling therebetween for shifting the hood laterally, said means including levers movable about axes fixedly carried by said means, means effective at the initial movement of the hood only for moving one end of each of said levers to thereby lift the hood, said levers being automatically movable in the opposite direction at the concluding movement of said first mentioned means for thereby lowering the hood, and a spring carried by said first mentioned means and operatively secured to said levers for normally counterbalancing the weight of the hood, substantially as described.

9. In a valve, a movable counterbalanced hood, a fixed track therefor, means for moving said hood along said track, and means cooperating with said track for imparting a substantially vertical movement to said hood at the commencement and conclusion of its travel only, substantially as described.

In testimony whereof I have hereunto set my hand.

ADOLPH H. MEYER.